

CLAIMS

- [1] A method for producing a Group III nitride crystal comprising:
growing a crystal in a nitrogen-containing atmosphere by reacting at
least one Group III element selected from Ga, Al, and In with nitrogen in a
5 melt that includes a flux including an alkali metal,
wherein the flux further includes Mg.
- [2] The method according to claim 1, wherein Mg of the flux functions as
at least one of a flux component and a doping component.
- [3] The method according to claim 1, wherein the flux includes as a
10 doping component at least one selected from an alkaline-earth metal (other
than Mg) and Zn in addition to or instead of Mg.
- [4] The method according to claim 1, wherein the nitrogen is supplied as
a nitrogen-containing gas.
- [5] The method according to claim 3, wherein the alkaline-earth metal is
15 at least one selected from Ca, Be, Sr, and Ba.
- [6] The method according to claim 1, wherein the flux is a mixed flux of
Na and Mg.
- [7] The method according to claim 6, wherein a proportion of Mg in the
mixed flux is 0.001 to 10 mol%.
- 20 [8] The method according to claim 6, wherein the Group III element is
Ga and the Group III nitride is GaN.
- [9] A Group III nitride crystal produced by the method according to claim
1.
- [10] The Group III nitride crystal according to claim 9, wherein a doping
25 amount of Mg is more than 0 and not more than $1 \times 10^{20} \text{ cm}^{-3}$.
- [11] The Group III nitride crystal according to claim 9, wherein a total
doping amount of Mg, the alkaline-earth metal (other than Mg), and Zn is
more than 0 and not more than $1 \times 10^{17} \text{ cm}^{-3}$.
- [12] The Group III nitride crystal according to claim 9, wherein an oxygen
30 concentration of the crystal is 0 to $1 \times 10^{17} \text{ cm}^{-3}$.

[13] The Group III nitride crystal according to claim 9, wherein a resistivity (specific resistance) is not less than $1 \times 10^3 \Omega \cdot \text{cm}$.

[14] The Group III nitride crystal according to claim 9, wherein a resistivity (specific resistance) is not less than $1 \times 10^5 \Omega \cdot \text{cm}$.

5 [15] A Group III nitride substrate comprising the Group III nitride crystal according to claim 9.

[16] The Group III nitride substrate according to claim 15, wherein the substrate is a p-type substrate or a semi-insulating substrate.

[17] A field-effect transistor comprising the Group III nitride substrate
10 according to claim 16.